

CLAIMS:

1. An X-ray source comprising:
- an electron source (1) for the emission of electrons (E),
- a target (4) for the emission of characteristic, substantially monochromatic X-rays (C) in response to the incidence of the electrons (E), said target (4) comprising a metal foil (5) of a thickness of less than 10µm and a base arrangement (7, 12) for carrying said metal foil (4), wherein the metal of said metal foil (5) has a high atomic number allowing the generation of X-rays (C) and the material substantially included in the base arrangement (7, 12) has a low atomic number not allowing the generation of X-rays (C), and
- an outcoupling means (11) for outcoupling the X-rays (C) on the side of the

5 metal foil (5) on which the electrons (E) are incident and which is opposite to the side of the base arrangement (7, 12).

10 2. An X-ray source as claimed in claim 1, wherein said base arrangement comprises a rotatable base plate (12) of a material having an atomic number of less than 10,
15 in particular in the range from 4 to 6.

15 3. An X-ray source as claimed in claim 1, wherein said base arrangement comprises a cooling circuit (7) arranged to allow a coolant (8) to flow along the side of said metal foil (5) opposite to the side on which the electrons (E) are incident.

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4. An X-ray source as claimed in claim 3, wherein the coolant (8) has a mean atomic number of less than 10.

25 5. An X-ray source as claimed in claim 3, wherein the coolant (8) is water.

6. An X-ray source as claimed in claim 3, wherein said cooling circuit (7) comprises a constriction (10) in the area of the metal foil (5).

7. An X-ray source as claimed in claim 3, wherein said target (4) further comprises a carrier (6) of low atomic number material, in particular having a mean atomic number of less than 10, supporting the metal foil (5) on the side facing the coolant (8).

5 8. An X-ray source as claimed in claim 1, wherein the metal foil (5) has a thickness of less than 5 μm , preferably between 1 and 3 μm .

9. An X-ray source as claimed in claim 1, wherein the metal of said metal foil (5) has an atomic number between 40 and 80.

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10. An X-ray source as claimed in claim 1, wherein said outcoupling means (11) is adapted to outcouple X-rays (C) at angles of an angular range from substantially 45° to 135°, in particular 70° to 110°, to the surface of the metal foil (5).

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11. An X-ray source as claimed in claim 1, wherein said outcoupling means (11) is adapted to outcouple X-rays (C) in a direction substantially antiparallel to the direction of incidence of said electrons (E), in particular in a direction at an angle in the range from 150° to 210° to the direction of incidence of said electrons (E).

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12. An X-ray source as claimed in claim 1, wherein said electrons (E) are directed onto the surface of said metal foil (5) at a substantially 90° angle.

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13. An X-ray source as claimed in claim 1, wherein said electron source (1) is located outside the X-ray beam (C) to be outcoupled, said X-ray source further comprising means (2) for directing the electron beam (E) onto the metal foil (5).

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14. A target for use in an X-ray source for the generation of characteristic, substantially monochromatic X-rays (C) in response to the incidence of electrons (E), said target (4) comprising a metal foil (5) of a thickness of less than 10 μm and a base arrangement (7, 12) for carrying said metal foil (5), wherein the metal of said metal foil (5) has a high atomic number allowing the generation of X-rays (C) and the material substantially included in the base arrangement (7, 12) has a low atomic number not allowing the generation of X-rays (C).